ABSTRACT

Title of Thesis:	AMERICAN DREAM 3.0: FLEXIBLE URBAN HOUSING FOR CHANGING LIFESTYLES
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Housing will always be an issue as population continues to grow at a rapid pace. It is projected that the demand for housing in the US will be driven up drastically after the recession. However, even if the population in the US stayed constant, the changing dynamics of culture, lifestyle, communities and technology is causing the existing housing stock created by a conservative industry to become obsolete in meeting the needs of the people.

This thesis will explore the tectonics, spaces, and social interaction of architecture that can adapt to support diverse lifestyles of households over time. Design strategies of buildings will be investigated to inform how a home can be made to allow variety, flexibility, and adaptability with consideration towards sustainability with small interventions over time. The project will examine how homes can be programmed for lifecycle living with consideration towards how communities can be created within the household and in the neighborhood.

AMERICAN DREAM 3.0:

FLEXIBLE URBAN HOUSING FOR CHANGING LIFESTYLES

By

Joanna Yu

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Chapter 1: Introduction

Flexibility in housing design is not a new concept, but it yet to be pushed to its full potential for the housing market in the United States. Instead, flexibility manifested itself in the forms of limited options and customization prescribed by builders or developers. This thesis will create a flexible housing prototype that would address several challenges present in the current housing market in the United States, and demonstrate its potential through a housing development project. The first challenge, and the main driver of the thesis, is the lack of housing choices created by the conservative nature of the housing industry that fails to support the variety of lifestyles of an increasingly diverse population. Second, this thesis will examine the concept lifecycle in housing recognizing the fact that households change and buildings become obsolete in meeting both the spatial, social, and technological needs overtime. The ability for a building to adapt can increase the life of the building and be more sustainable in the long run. Lastly, this thesis examines how the design and fabrication of housing can be used to help address the challenge of bringing affordability in housing.

Chapter 2: Opportunity for Returning Flexibility in Housing

> "The United States has a housing crisis of disturbing complexity, a crisis that, in different ways, affects rich and poor, male and female, young and old, people of color and white Americans. We have not merely a housing shortage, but a broader set of unmet needs caused by the efforts of the entire society to fit itself into a housing pattern that reflects the dreams of the mid-nineteenth century better than the realities of the twenty-first century." – Dolores Hayden

For the majority of the 20th century, the American housing industry has based development decisions on the ideals of the "American Dream" and designed for the needs of the "traditional American family." However, following these old ideals and the conservative nature of the housing industry to adopt new ideas has contributed to some of the housing issues America is facing today. As a result, the need for flexible homes is driven by three factors, the increasingly diverse demographics, changes in household lifecycle and building life, and consideration towards affordability .

The American housing industry has for a long time based their development decision on the ideals created in the post World War II that narrowly defined the ideal American lifestyle. These homes were based on the idea that the home was a "haven for the white male workers' family" in which the man has the role of being the sole bread winner, while the wife is the home maker raising the children. The majority of the housing development came in the form of prescriptive suburban homes that was meant to support the 'traditional" family. [1]

[1] Hayden, Dolores. Redesigning the American Dream. New York: W.W. Norton & Company, 2002. Pg 28

Changing Demographics and Values

One of the driving factors in the need for flexible housing is the increasingly diverse demographics and values. As a result focusing on the ideals of the American dream, the housing built since then generally has ignored the growing number of demographics with alternative needs and lifestyles, and created a challenging market for these groups to find suitable home. It is estimated that 80% of the total housing stock in 1999 was built after 1940. Two thirds of the 100 million occupied housing units was single family detached homes. Also in the past decade alone, housing production were estimated to be built at the rate of 2 million homes per year, out pacing the demand and therefore "contributed to the housing collapse."[2] In addition, the single family houses have gotten larger every decade from 1940 to 2000, while the average household size declined from 3.68 to 2.59 in the same period. [3]

The Urban Land Institute has identified "four major demographic waves" that will challenge the ideas of traditional life cycle pattern and will need the housing market to provide suitable housing solution to meet their needs. These groups are the older baby boomers, young baby boomers, generation –Y, and immigrants and their children and grandchildren. Each of these demographic groups is identified to have unique set of needs and challenges from the current housing market.[4]

The baby boomer generation, about 78 million people, are expected to diverge from the traditional retirement cycle of their parents. They are healthier and more energetic and will likely delay moving into retirement or senior care communities by at

[2] Hayden, pg 18
[3] Hobbs, pg 132
[4] Mcllwain, 10-11

least a decade.[5] They are expected to retire later because they enjoy their work or they need to rebuild their retirement funds. The older baby boomers will be entering their "senior" years beginning in 2011 and will begin the fast rate of growth to the senior demographics. A survey conducted by RCLCO has found 75% of retiring boomers wanted to have the urban lifestyle. Majority of this group have already sold their homes and moved to urbanized town centers rather than going to traditional retirement communities.

The young baby boomers, who are between their late 40's to 50's, make up two thirds of the baby boomers and have very different challenges due to the economy. This population of homeowners will most likely have children still living at home or have returned home. Even if they planned to move into an urban community, they are most likely to be stuck living with their suburban homes for sometime due to the lost value of their homes and a smaller group of buyers.

The next demographic groups, the Gen-Ys that are emerging into the work forces are expected to bring "radical changes" to the housing market demographics. This generation of late teens to early 30's, has approximately 83 million people and is still growing due to immigration. One of the major changes this generation brings is how women's demographics are changing. For the first time in US history, there are more women in higher education and earning 60% of the master's degrees. These women are expected to become dominate in the workforce while at the same time many are expected to be living alone at greater number then the men. [6]

[5] McIlwain, 12
[6] McIlwain, 14

The values held by the Gen Ys has been influenced by the internet and social networking where information moves quickly and social gathering happening in shorter time. This generation values community and diversity, and they do not see ethnicity as an issue. Instead, Generation Ys group themselves based on education levels and a fusion of culture. They are also more committed to a healthy work and life balance, and are most concerned with the environment of all the generations at this time. All these values help reinforce their desire to live in urban areas where they would have amenities, the ability to have a social gathering quickly within a larger community.[7]

The current economic crisis has also made a large impact on Generation Y in both their values and their financial future. This generation will be more income constrained due to large education loan debts, lower income level and less jobs available to them as they enter the workforce. Witnessing the housing market crash and the loss of equity or even foreclosure of their parent's generation has caused a lack of confidence in home ownership as an investment strategy. They are not relying on social security to help them in the future and will most likely build personal savings for retirement. Due to the economy, Gen-Y has been delayed in starting a household. Instead they have moved back with their parents or have roomed with peers.

The housing challenge for this generation is the financial constraint that will prevent them from living in the urban cores that they desire. Instead many are expected to be forced to move into the suburbs in order to be able to afford a place but offset by the cost of commute. Many are willing to live in smaller homes if it means they could live in the urban areas.

[7] Mcllwain 14-16

Immigrants and the later generations make up the last demographic group that will have a large impact on the future housing market. Ethnic diversity will only increase, bringing in a mix of cultural values into the US that do not fit into the traditional American household lifecycle and model even if they are looking to get the "American Dream" of homeownership. The cultural difference could be seen on a variety of scales, such as how a room will be used or who is included in their household. Immigrant families are more likely to live in multi-generational household either due to their cultural influences or financial constraints.

These demographic profiles demonstrate how a population is constantly changing through each generation, and how their needs and challenges can vary.

Lifecycle of Households and Building

The US population is becoming more diverse and complex, not only through changing household types, but through generational and personal lifestyle differences. Over the past couple of decades the number of non-traditional household formations grew, while the traditional households of married couples with children declined. In 2002 about 25% were married couples with children under 18 but only 29.2 percent of those families had the father as the sole income producer. Meanwhile, the fastest growing household formation is the single-parent, with about 80% of single parents being headed by women.[8] Since 1980, households of one or two people have become a growing majority in the household size.

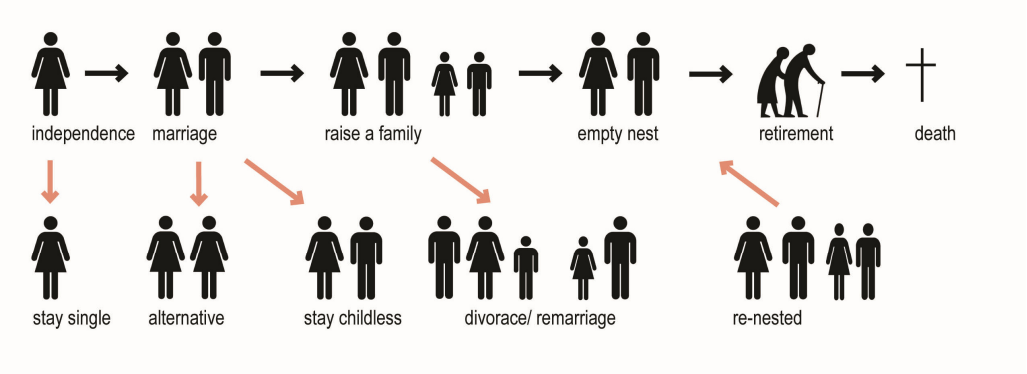

Figure 2.1: The traditional lifecycle stages and alternative stages that people may go through.

The existing housing industry tend to create specific housing design to support a specific stage or lifestyles, such as retirement homes, and this model of building cannot adapt to changes in the community demographics and will result in housing issues when the existing building stock cannot support the need of the population changes. This in turn causes a building's own lifespan to be shortened when they are forced to be

[8] Hayden, pg 59

demolished in order to create development that will meet the needs of the population that is driving the housing demand. Many developers or property owners of rental properties choose to demolish and redevelop as the more cost effective decision. Homeowners on the other hand may have to heavily renovate in order to compete in the market to sell their homes.

Current housing development practices encourage cheaper and inflexible construction of buildings that in turn is causing buildings to become obsolete faster. Buildings become obsolete when it can no longer support the spatial and the technological needs. With households undergoing lifecycle changes while new technology for home use are developed over time constantly, the building has to be adaptable enough to support these changes or become obsolete and be left to deteriorate.

It is also unrealistic to expect the prescriptive housing design strategies applied in the single family homes and multifamily units of the past will still work today. There is an opportunity here to push the flexibility in housing in order to deal with the diversity of lifestyle existing today and the coming future.

Affordability in Housing

Affordability has always been an issue in housing and with the current recession and the mortgage crises; it is one of the forefront issues. Affordability is not only a political, social, and economic issue but a design problem as well. The failure of good design consideration has helped create problems with affordability of homes and the failure of many government initiatives.

One of the reasons that many people cannot afford a home is that there are limited choices in the size of the home.[9] The industry has produced bigger homes and sold at a price that not many could afford. Instead of producing alternatives for the market, the industry left the issue of affordability to government policies and programs. However even these programs have failed multiple times, due in part because of the poorly designed, cheaply built housing that ignore the quality of life in the neighborhood. The focus on cost savings resulted in housing that "incubated crime and other social problems." [10]

Another challenge created by the traditional ideals is the lack of consideration towards affordability. The housing industry provided a tradition of "driving until you can buy," a saying that came out from how affordability in housing was provided by its location away from the city. However, over the decades, the commute time and cost of gas removed any financial savings a person had from living further away. This practice also ignores the elderly who may be been priced out of their homes from their fixed income and can no longer drive, and the single parent who may not be able to afford both the time in commute and the cost for childcare.[11]

Flexibly designed housing has a great potential to provide some form of affordable housing solutions. There is a potential for providing more options so that buyers could find a home that fits within their budget in a desired community.

[9] Friedman, Chasing the American Dream. page 146
[10] Rohe, 111
[11] Bohl, 113

Chapter 3 Approaches to Flexibility

The term "flexible" has a very broad definition in architecture, in part to allow the inclusion of a range of strategies that provides adaptability in respond to a particular change or need. In one definition flexible buildings are "designed to respond easily to change throughout their lifetime"[12] and in another it is a building "that can adjust to changing needs and patterns, both social and technological."[13] Both definitions suggest that flexible buildings are designed with the ability to meet changes that will happen over time. The definition of "change" is also very broad as it can include social, cultural, economic and technical changes that can impact how housing would remain relevant.

The primary intended goal of flexible housing is the creation of a building that would remain in use longer for being able to meet the current need rather than being used under an external force. Benefits of flexible building include the ability to meet purpose better, accommodate the user's intervention, accept new technology, and be more economically and ecological viable.[14] In essence, these buildings can respond to these changes by adjusting their use or operation.

There are many different ways to provide flexibility in a building. These strategies can be applied to the building on various level of scale, smallest level being being applied at the scale of a single room, to the largest level being the whole building. Strategies can be categorized under adaptability, transformation, mobility, and open building.

[12] Kronenburg, p6
[13] Schneider, p4
[14] Kronenburg, p7

Scales of Flexibility

Flexible design solutions can be implemented at three different scales in a building. At the first level flexibility introduced through the use of space, such as altering the furniture layout or layering different activities in a room. At this small scale, the user can make daily adjustment, albeit somewhat limited, to meet their needs even in a traditional home. At the second level, flexibility can created through physical changes applied to a room, such as sliding wall. At this level, more effort of the user is needed to create the changes in room. At the largest scale, flexibility could be provided in how the building could support changes, such as the ability to expand or contract. Changes at the largest scale would be the least frequent and potentially most expensive.

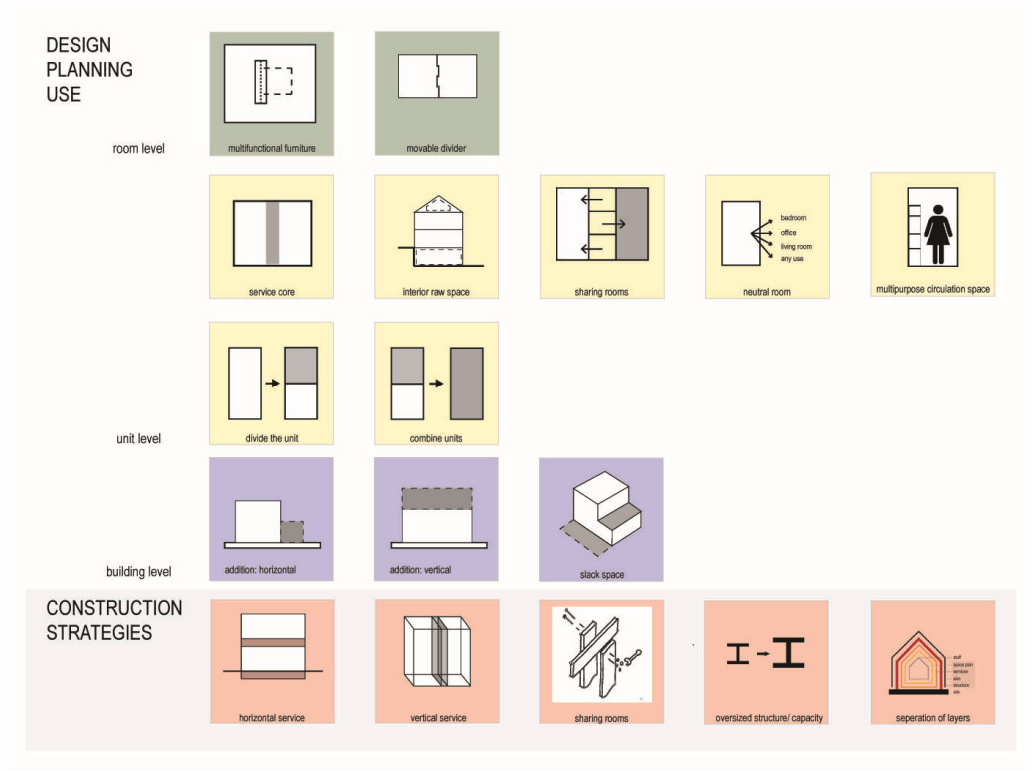

Figure 3.1 – Chart of flexible strategies that can be applied in design and planning or in construction. Within the design or planning phase, flexibility can be applied on three scales: the building, the interior space or an individual unit, or within a scale of a room.

Adaptability

Adaptability of a building is its ability to respond "readily to different function, pattern of use, and specific requirement."[15] This strategy allows for installation of new technology, and allows occupants to participate in the design process. Adaptability requires more "collaboration between a ranges of participants to interact with the decision process."[16] This strategy focuses on designing and constructing the building to allow changes to be made to the building or have spaces be designed to allow multiple functions without the need for heavy renovation or demolition. For example, the location of the plumbing system can placed in highly accessible place such that in the future, the plumbing can be updated without heavy construction activities.

Transformation

Transformation is the method in which buildings can change "shape, space, form or appearance by the physical alteration of their structure, skin, internal surface" to change the way a building can be used through a device or construction that has been incorporated into the building. This strategy focuses on the use of technology built into the construction to change the building, such as a sliding wall system or built in furniture that transforms a compact room for multiple function, for a specific type of flexibility. A building that uses transformation strategies does not necessarily mean the building is easily adaptable to future needs.

Transformative elements can be very simple or very complicated to implement as moving elements of a building may require greater design and manufacturing work in

[15] Kronenburg, 114
[16] Kronenburg, 119

order to deal with three concerns; how the mechanism works, joining of internal and external partitions, and how the building systems of particular rooms would operate under different conditions.[17] One concern with overly complicated or mechanized system would be the maintenance and cost consideration. A simple system may require a user to move it physically.

Moveable elements in a building can provide several positive opportunities. One opportunity would be the ability to change the character of a space and its relationship to other spaces. An area could be used multiple times for different functions. Boundaries could be removed or added to the building to alter the privacy level. In addition, having a person engage in the physical change of a building can make the building feel more dynamic.

Mobility

Mobility is also considered a strategy of flexible design. Moveable buildings are usually a specialized structure that is "designed to be moved in order to fulfill their purpose". In relation to housing, mobility could be portable homes or modular designed homes that can fit onto different sites for either permanent or temporary installation. There could be a potential for homes to expand or contract with addition or removal of units overtime.

Open Building

Open building is similar to the adaptation approach but is more systematic and specific in the design process. Open building approach is most frequently used in the US

[17] Kronenburg, 145

for commercial and retail construction, where tenant turn-over can be short, as it allows end users to build their infill without affecting the base building. The open buildings approach "subdivides technical, aesthetic, financial and social decision into distinct levels of decision making" where it allows end users and the community to participate as an integral participant. [18]

The key concept involves the construction of the building in two separate systems, the base building and the infill. The base building includes all systems that are permanent and shared part of the building including structure and service systems. The infill portion is any systems that are utilized by individual units and are under the control of the owners. In addition, this approach takes into consideration of the lifecycle of different building systems and subdivides them into different groups so that in the future they can be replaced without disrupting other services. Open buildings includes methods that extend a buildings life cycle and considers sustainable approaches.

Residential open buildings, usually in the form of multi-family housing, have not been established in the US, however this system has been used in Netherlands and Japan. The challenge in residential open building in the United States is related to the lack of financing that could support this kind of project, zoning, and other legal issues that other countries have already provided solutions for.

[18] Kendall, 6-7

Level of Control

A conceptual consideration in designing flexing housing is the question of how much of the design should be determined by the architect or end user. In the book *Flexible Housing* the authors describe two different approaches, "soft and hard" that designers apply to their project at a varying degree. The soft approach allows for interminacy of spaces in which the users are allowed to change the space to suit their needs, while the building architect works in the background. The hard approach, in which the architect exerts more control in the design, creates spaces that may have predetermined uses and flexibility options.

Chapter 4: Development of Flexible Housing

The development of flexible housing is viewed to have originated from two sources, the evolution of vernacular architecture and the design interventions of the 20th century. Flexible housing was first developed through vernacular architecture, "deriving solutions through long-term adjustments to patterns of use and cultural formations" that took into consideration of the challenges of the climate, site, and other limitations.[19] In contrast, the second development of flexible housing was the result of designers "deriving solutions through the authority of expertise" in response to external forces that required innovative solutions.[20]

Vernacular housing in multiple cultures developed to be inherently flexible. This type of architecture tends to support multiple activities within a single room and is able to support multiple generations. The buildings were designed in response to cultural, climate, site and resources needs. The traditional Japanese house is an example of flexible housing model that developed over centuries.[21]

Overtime, particularly in western cultures, flexibility was replaced with the ideas of rigidity with activities separated into dedicated rooms. It was only in the 20th century with the rise of external pressures, such as housing crises and new technologies that the architects sought to use flexibility in the housing design.

There are three major moments in the 1900's that helped to push the development of flexible housing. The first movement towards flexible housing occurred in the in Europe during 1920's where there was a major housing crisis for the working class.

[19] Schneider, 13
[20] Schneider, 13
[21] Schneider, 6

Countries across Europe sought to provide mass housing for the working classes. The response to the crises in general was to provide subsistence dwelling, where the standard home sizes were reduced in order to allow construction of more homes at a faster rate. Due to the smaller size of the homes, architects incorporated flexibility in the spaces so that residents would be able to utilize their spaces more.

Flexible design was once again pursued in the 1940's with the housing shortage after the war, both abroad and in the United States. During this time the introduction of prefabrication and other mass production technologies came about as housing became industrialized. A new belief that with prefabrication flexibility in housing would be inherent and that standard of homes would be raised. However, many of the iconic flexible homes were designed for particular clients rather than homes for the masses. Unfortunately prototypes featuring flexibility were never really mass produced. As families tended to sell and move into larger homes, the need for applying these innovations was not perceived.

In the 1960's and 70's, attention returned to the idea of flexibility but with the focus on how the end user could be involved in the design process. Flexibility was considered to be provided through a choice in the design via predetermined options but the houses themselves were still very static. Mass produced homes were designed to a particular standard based on the perceived needs of the average American family rather than changing lifestyles. The builders did not see the value of investing in innovative housing design when the standard practice brought in profit. Explorations in flexible

housing design continued over the decades, but many of these projects never went beyond concept or prototype stage in the United States.[22]

[22] Schneider, 20-25

Chapter 5 Flexible Housing through Townhouse Typology

The townhouse, known by many names such as terrace housing, is considered one of the most flexible housing forms and would support the design of flexible housing through the opportunities and advantages the typology provides. Townhouses are one of the oldest housing typology and have been used in urban, suburban, and occasionally rural context. They are able to respond to variety of constraints including issues of site, context, and density through programming, design of the building, and their configuration within the site. FGH34

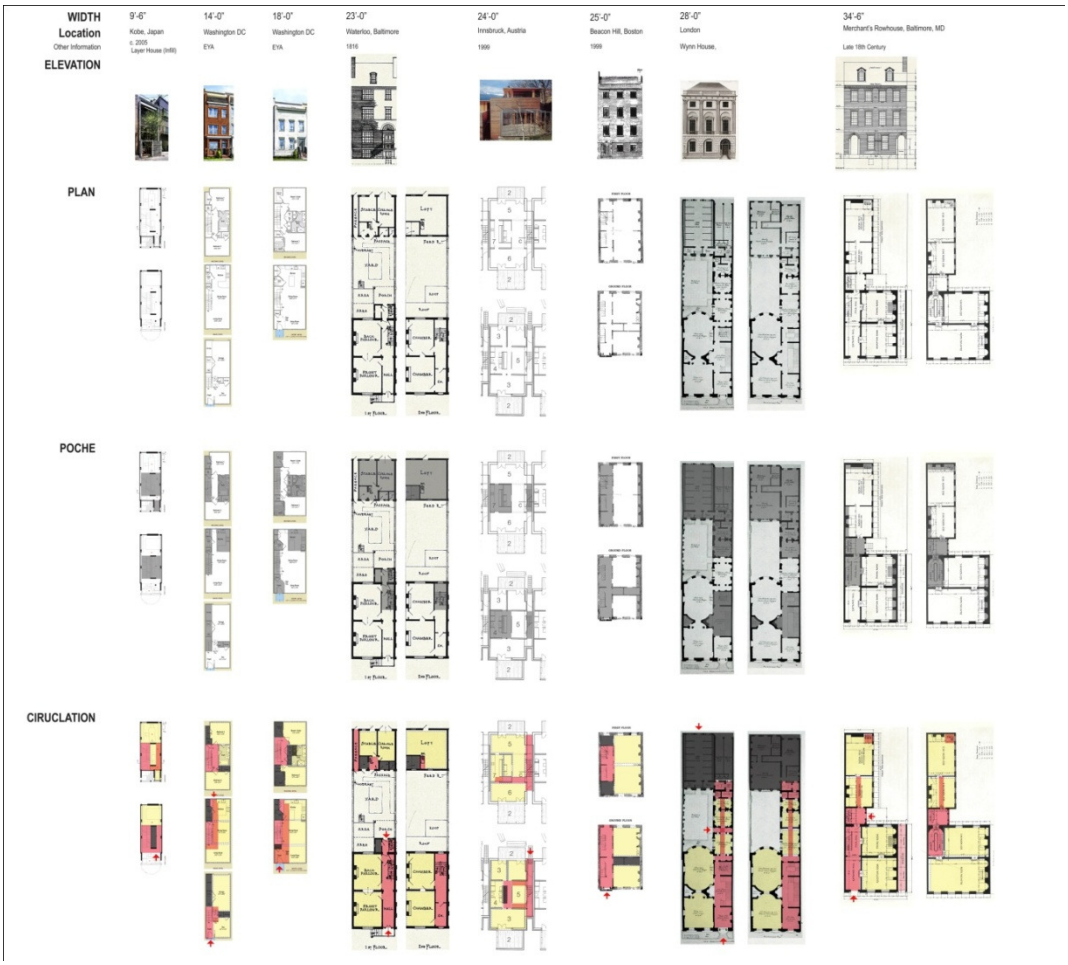

Figure 4.1: Study of townhouses of various widths

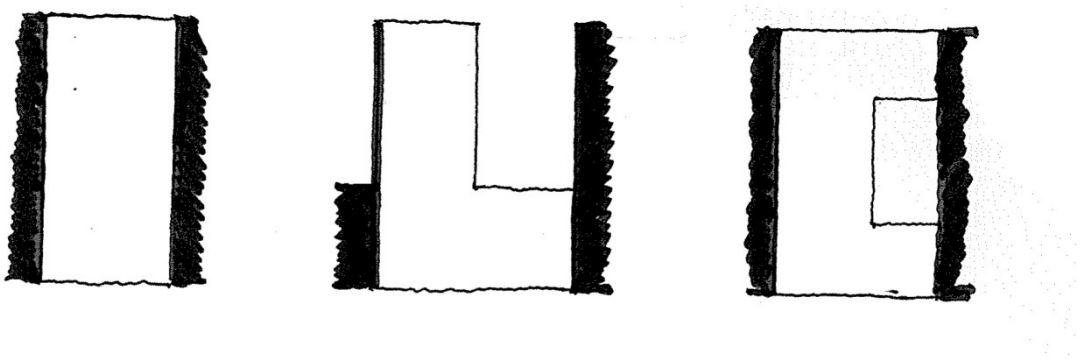

Figure 4.2: Examples of basic townhouse shapes; narrow block, “L” shape, and interior courtyard.

Townhouses are typically narrow buildings, between one to five floors, with deep proportions that share one to two party walls with another townhouse, usually with the front and back facades available for entry and natural day lighting. Orientation of the building has significant impact in the depth of the townhouse. East- west orientation allows for greater depth, while the north-south orientation will be shorter due to the limited day lighting available.

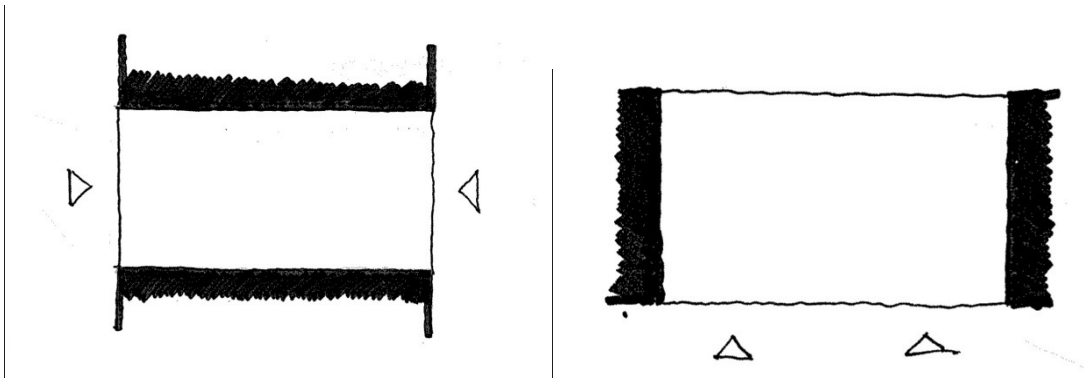

Figure 4.3: East-west orientation (left) and North-south orientation (right) diagram

Figure 4.4 : Examples of how townhouses relate to the ground level and street

Townhouses have several advantages that make it a popular building type. They can be used in multiple contexts allowing for a greater application of the prototype, including dense urban context where land is limited. An advantage of using townhouse type is that they can be built on very narrow lots and have the benefit of reduced construction cost from the shared walls. The building also provides private front door entrance with direct street access that other dense residential developments such as apartments do not typically provide for its units.

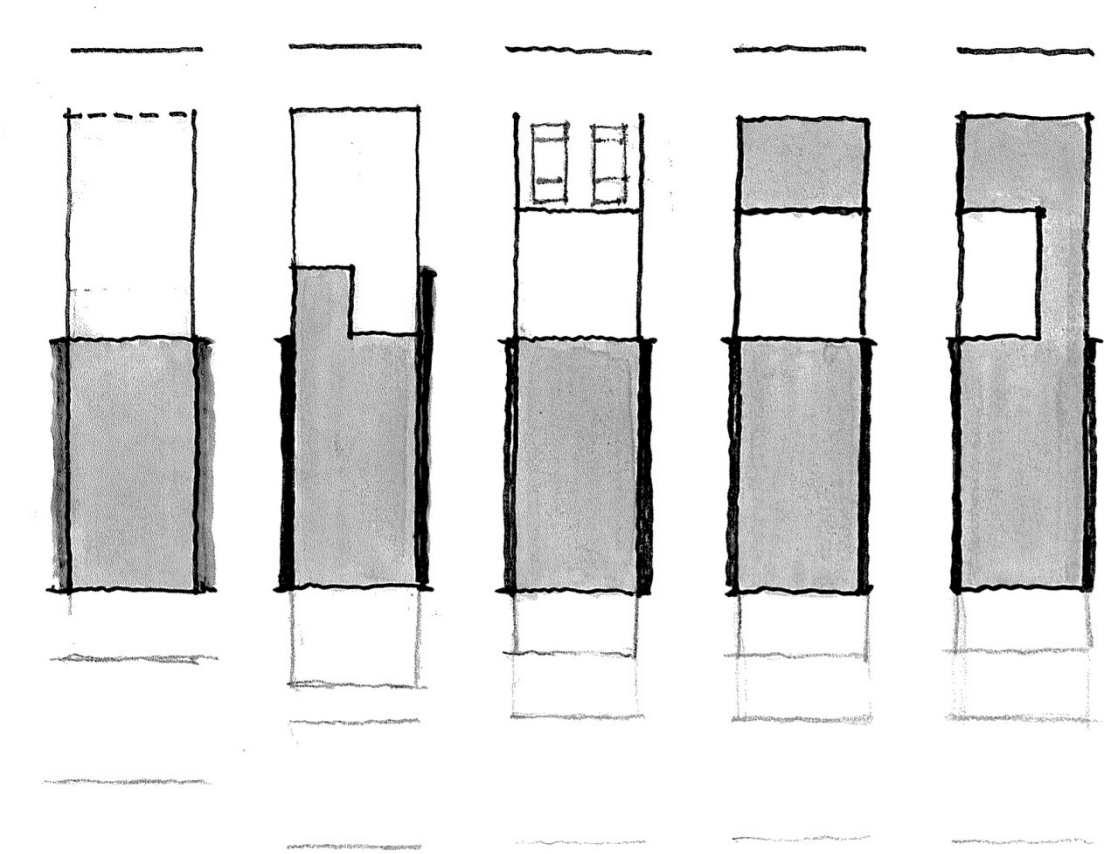

Figure 4.5: Typical examples of how townhouses sit on their lot when provided with an alleyway behind the property.

Townhouse developments are typically provided with a yard, and in many cases they have both front and rear yard. The front yard serves to create a threshold between the public street and the private property. However, in an urban context front yards are often forfeited for a greater back yard and a closure relationship with the street. When the townhouse is built up to the property line, privacy is created through raising the main floor level above the ground and the front stoop becomes the threshold between public and private space. In developments where an alley is provided parking or garage structures also built.

Figure 4.6: Comparison of expansion opportunities based on attachment condition

However, townhouses have their share of design challenges such as the challenge of providing natural day lighting and expansion opportunities due to their attached condition. Compared to detached and semi-detached housing, townhouses can expand mainly towards the back, especially if it was built up to the property line. Also providing accessibility can be a challenge based on its relationship to the ground, number of floors, and the narrow dimension of the unit. Unless accessibility is taken into consideration early in design, adapting the townhouse for accessibility later can be challenging.

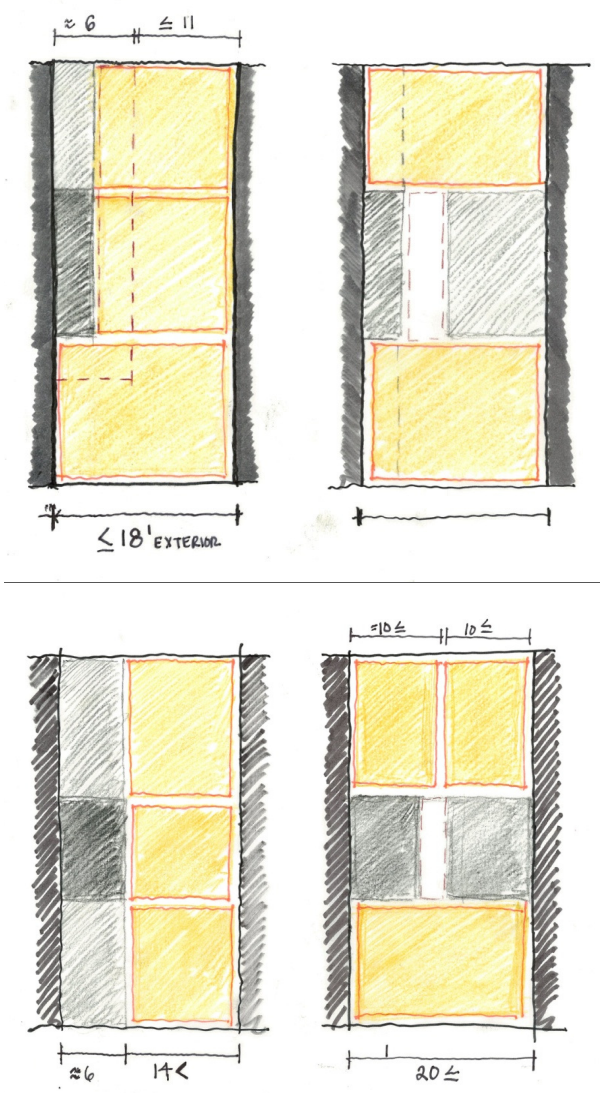

Figure 4.7: Dimension Study Summary

The townhouse also has some limitation on the plan variation due to its narrowness and attached condition. The dimension of the townhouse can create a challenge in the adaptability of the townhouse from single unit to multiple units. When the townhouse is 18 feet wide or less the townhouse will typically one room wide. The circulation within the building will also overlap into the program spaces. If vertical circulation is to be isolated for a multiunit program, much space will be lost. However, townhouses with at least 20 feet of width can afford to have a vertical circulation zone

without overlapping into program space. In addition, two small rooms can fit within the width.

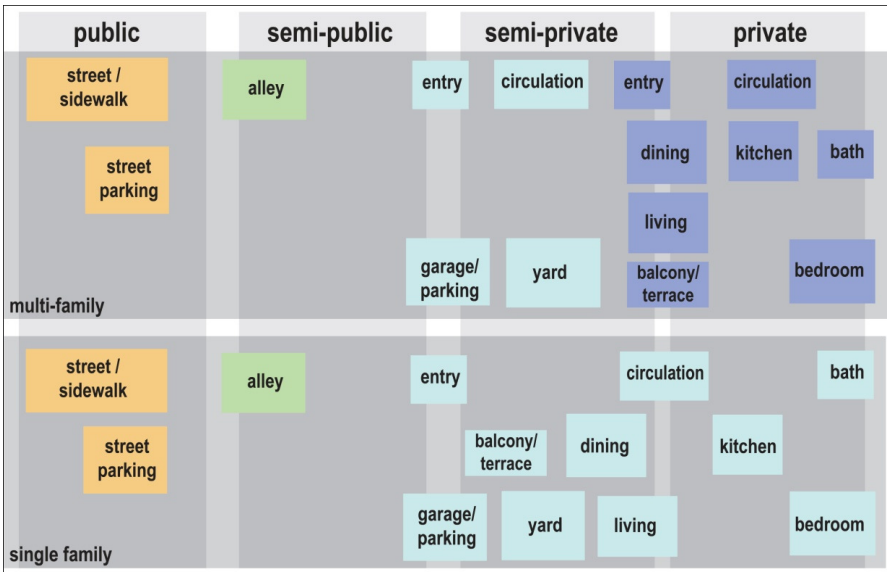

Figure 4.8: Program analysis of public and private zones within multi-family or single family use within a building.

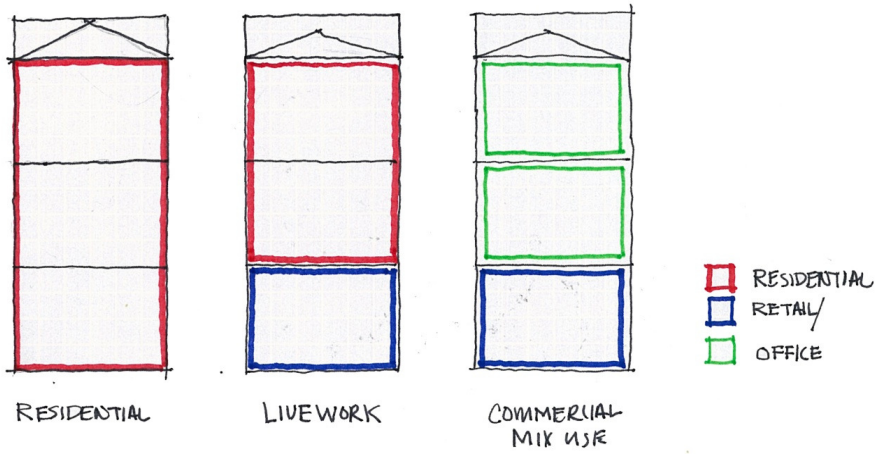

Figure 4.9 Diagram of uses that townhouses had supported

Townhouses have also been used for mix-use projects in both adaptive reuse and new developments. Live-work and small commercial mix-use in townhouse buildings are common in cities and urban town centers of suburban communities.

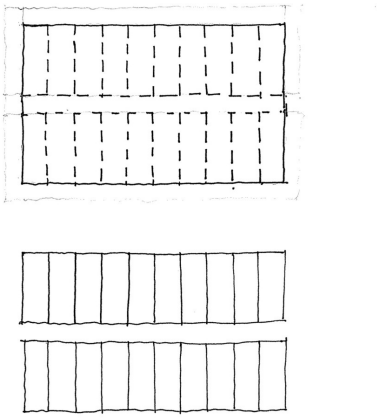

Figure 4.10: Townhouses on a single large property (above). Townhouses on individual property lots (below).

A townhouse development can lend itself to different type of ownership structures and be designed to reflect the various opportunities and constraints of different ownership type. Freehold ownership of town homes typically allows single family occupancy with some zoning codes allowing for additional occupancy through a granny flat. Other ownership such as rental housing, condominiums, or cooperatives can be applied to a development of townhouses on a single large lot.

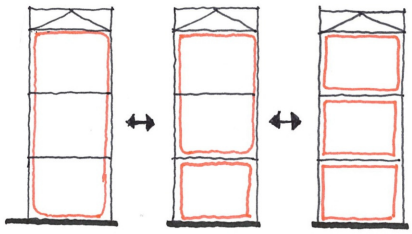

Figure 4.11: Individual lot ownership unit expansion or division potential. Multiple units can be created through vertical division or expansion.

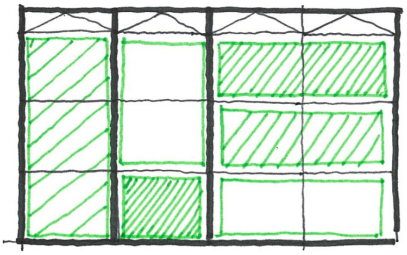

Figure 4.12: Multiple buildings on single lot unit expansion and division potential. With multiple buildings owned by single entity, units can divide or expand in both vertical and horizontal direction.

The range of established uses of the townhouse typology provides a greater opportunity for exploring the adaptability of housing and extending a buildings lifespan.

Chapter 6: Site

Introduction

The site is a vacant lot located in the northeast quadrant of Washington, D.C at the intersection of 17th Street and Maryland Avenue Northeast, adjacent to the H street Corridor. The site is located less than 2 miles from Union Station, the US Capitol, National Mall, and RFK Stadium. The property is located in the sub-neighborhood of Carver Langston within the larger neighborhood of Trinidad. Carver Langston is bordered by Trinidad, the National Arboretum, Kingman Park, and the Atlas District and in close proximity to Capitol Hill Neighborhood.

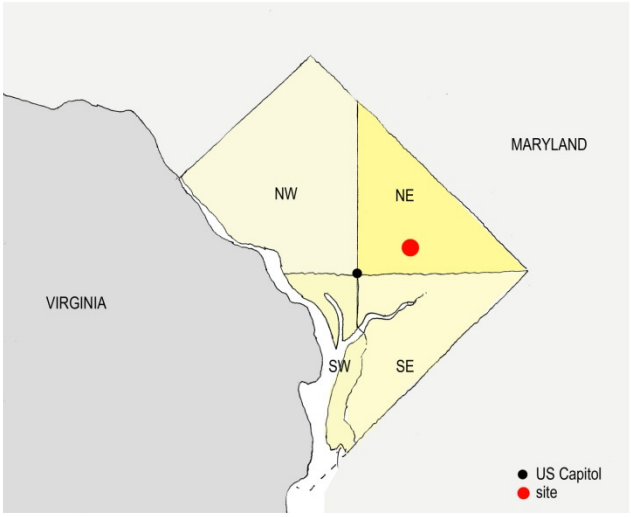

Figure 6.1: Site is located in Northeast quadrant.

Site Selection Process

In addition to architectural consideration, the site selection process included real estate development consideration of cost, and development opportunities. Therefore, site selection was narrowed to the northeast quadrant of Washington, D.C. where many neighborhoods are at the beginning stages of redevelopment and where development prospects are greater. The northeast provided greater opportunities to find a site in a transition, between low to medium density, likely demographic changes or population growth, and need for new housing. A site located in an area undergoing changes was considered to be ideal for explore various aspects of flexibility. In contrast, neighborhoods in the northwest are becoming overdeveloped and expensive, with fewer opportunities to find large vacant lots, and where there is little population growth, economic diversity, and demographic changes.

Three sites were selected for further analysis from the areas around the H Street redevelopment or the CUA- Brookland redevelopment efforts. The three sites were then compared to each other based on street access, access to mass transit, zoning, property size, building use and type around the site, and community amenities. The result was the decision to go with Site 1 which was a large vacant property with good street and transportation access, and zoning that would allow a range of residential typologies and densities. Site 2, located in the H Street Corridor, was a collection of parcels with different zoning and density requirements that would complicate the project. While Site 3, located in Brookland lacked street access, was surrounded by single family detached housing and was too far removed from the development activities.

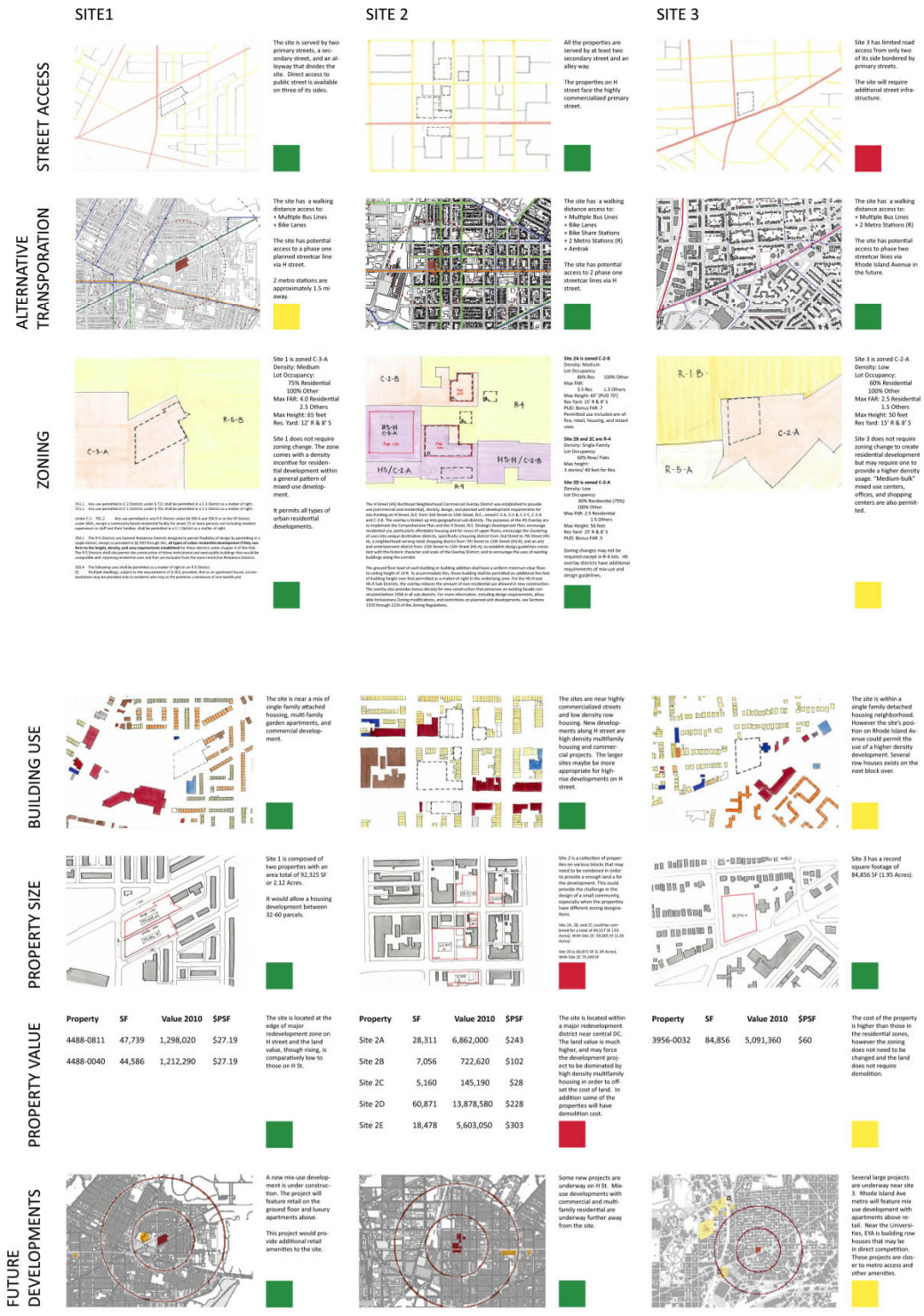

Figure 6.2: Site Comparison Board 1 and 2

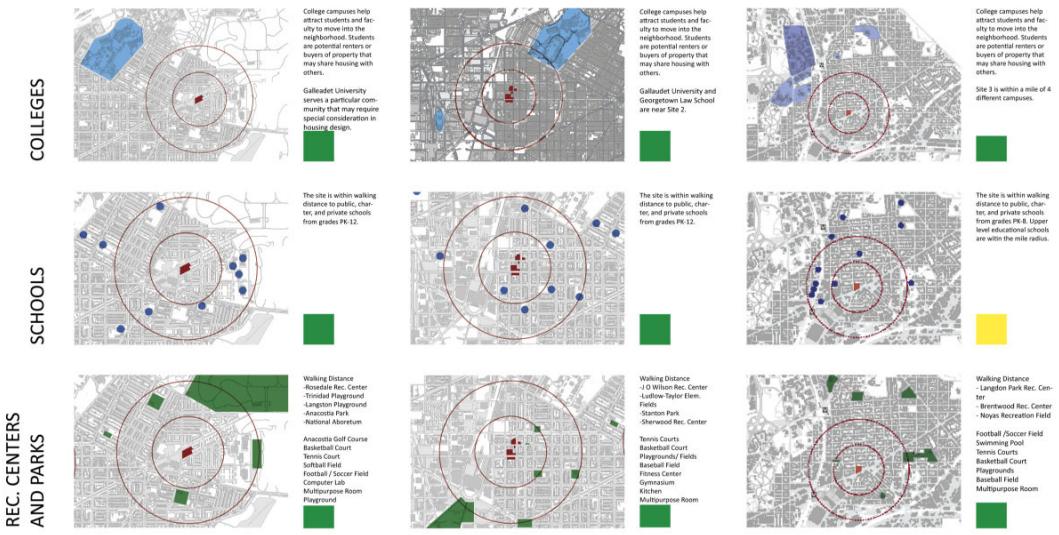

Figure 6.3: Site Comparison Board 3

Site Analysis

Access

The site is 15 minutes away from the Washington Beltway, and is located less than 2 miles away from New York Avenue Northeast (Route 50) and Rhode Island Avenue (Route 1). Primary access to the site is provided by Maryland Avenue that intersects with other major roads such as H Street, Bennings Road, Florida Avenue and Bladensburg Road. The traffic around the site is generated from nearby destination and highway access. Nearby destinations include the H Street Corridor and Hechinger Mall, located west of the site, and by highway routes that take drivers out of the District and into Maryland.

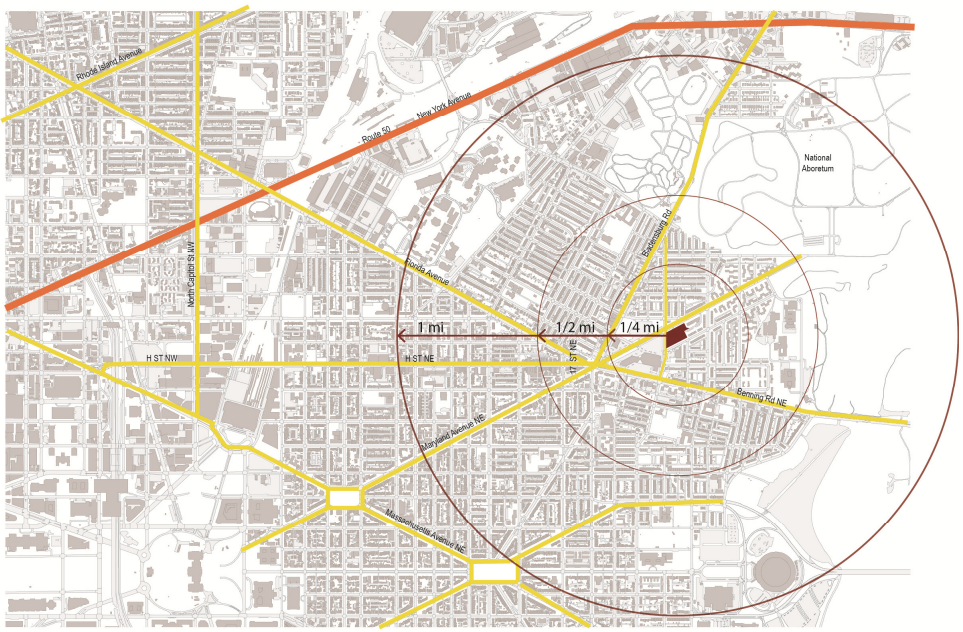

Figure 6.4: Access diagram of major roads around the site

The site can also be accessed by alternative mode of transportation that can serve as an amenity to people looking to be more environmentally responsible or be more independent from driving. Within a 15 minute walking distance, the property has access to multiple metro bus routes, dedicated bike lanes, and the new street car line that is expected to operate in couple of years.

Figure 6.5: Alternative Transportation Diagram

Neighborhood Context

The site is mainly surrounded by residential blocks of single-family attached housing and garden apartments, with commercial mix uses west of the site. The mall adjacent to the site is projected to be a mix-use development in the long term. In the vacant site northwest of the property is also planned to be a mix-use development with the first phase being mix-use multifamily luxury housing.

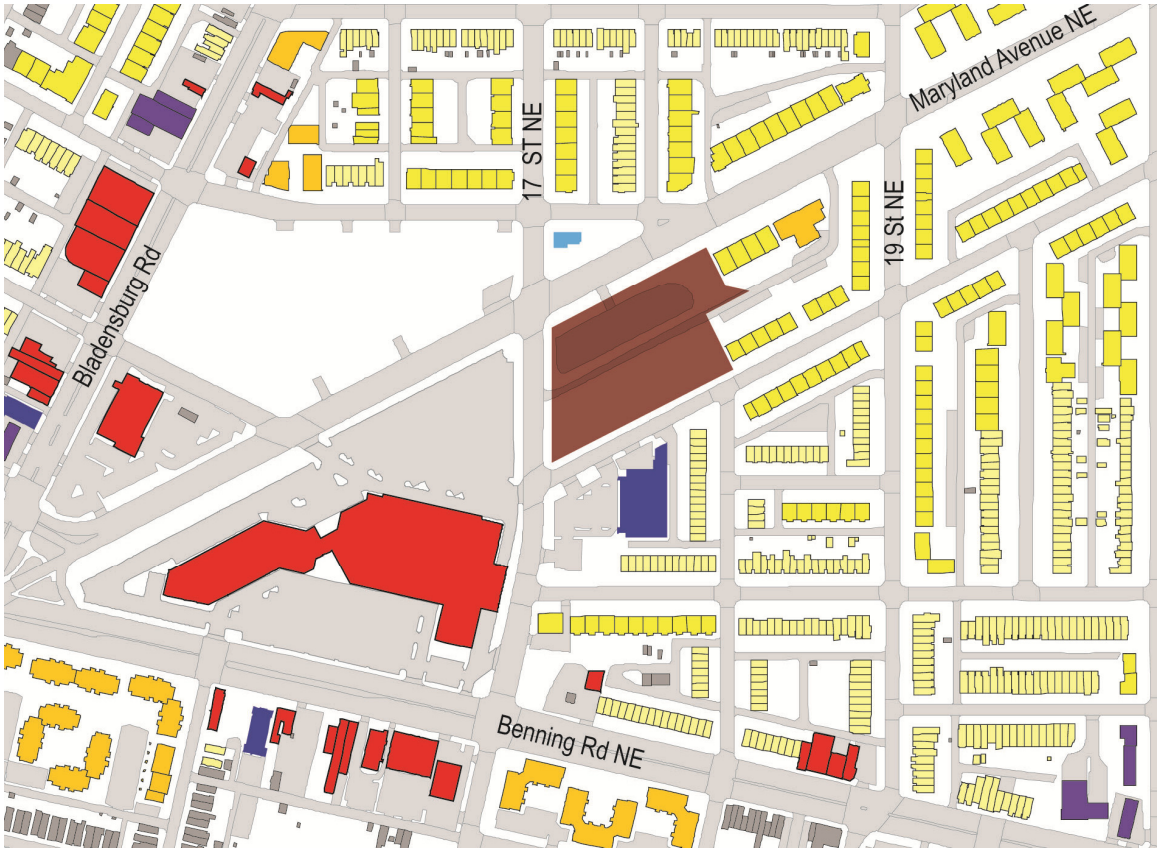

Figure 6.6: Building Use Map

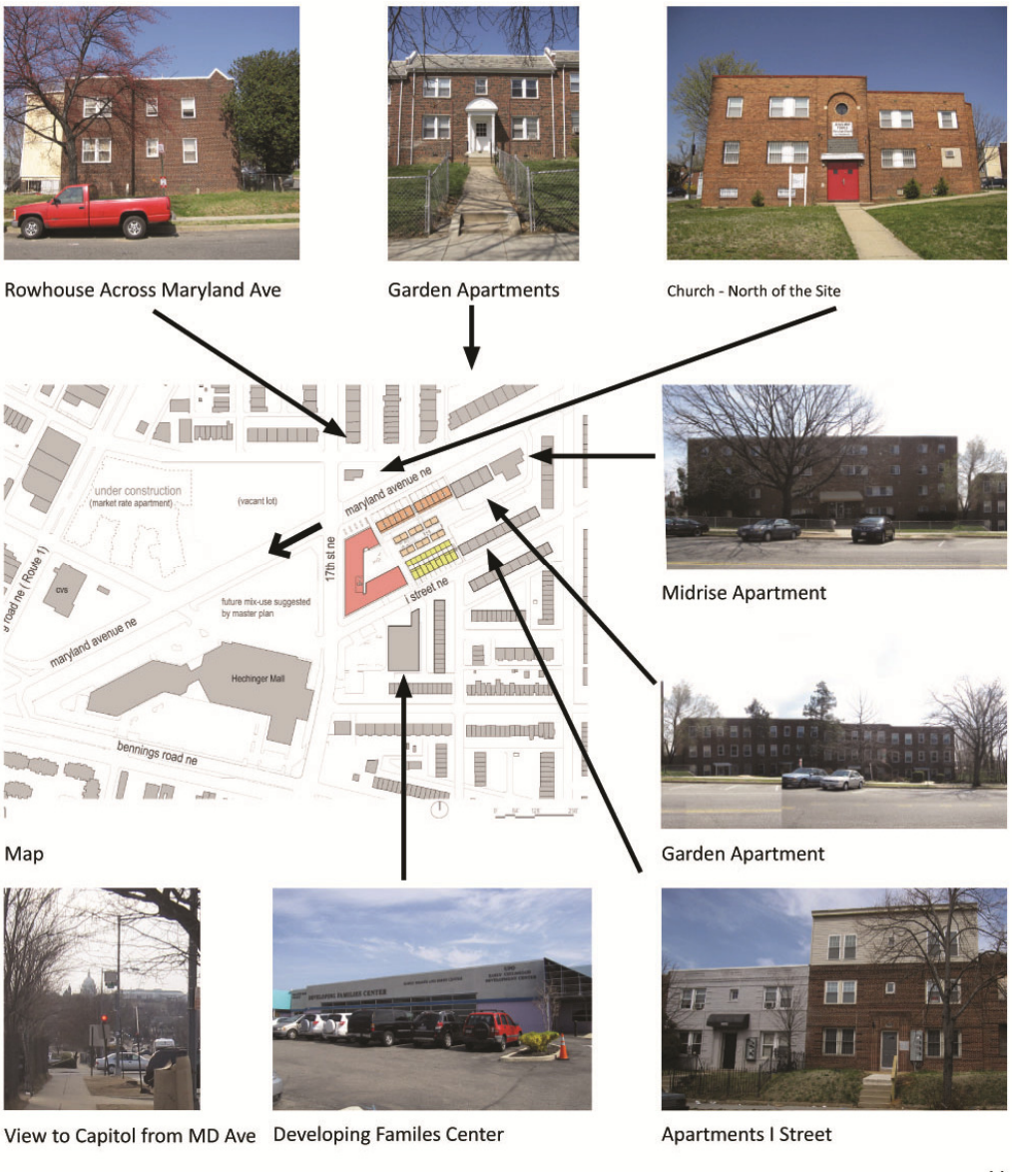

Figure 6.7: Photos of existing buildings around the site.

The residential buildings in Carver Langston were built mainly between 1920-1940's as a low to middle class housing development. These buildings are approximately 20-22 feet in height, red brick buildings with simple punched windows, and lack architectural detail and character that are featured in adjacent neighborhoods. Today, many of these residences are in need of significant renovation.

Zoning and Record Information

The project site, located in Ward 5, Triennial Group 1, was originally two lots separated by an alleyway until it was combined into one property of 100,011 square feet as SSL 448-0040 in 2010. The land value was assessed to be 2,787,000 in 2010 and was purchased Aldi Inc. Maryland in November 22, 2010 for $3,000,000.

Current zoning of classification of C-3-A for Major Business and Employment Center on the property "permits matter-of right medium density development, with a density incentive for residential development within a general pattern of mixed-use development" and "matter-of-right development for major retail and office uses." Current zoning allows all the uses approved for the R-5 residential zoning which includes single-family detached, semi-detached, townhouses, apartments, and flats giving the project various housing options without the need for a zoning change. With the current zoning, the site is given a greater density, height, and bulk requirement compared to the R-5 zoning that surrounds the site.

Current Plan for the Site

The current development proposal for the site is a free standing, single level, 18,761 SF Aldi grocery store with 88 spaces of surface parking around the site. This proposal underutilizes the development opportunities provided by the existing zoning that allows for a greater density for a project designed for a suburban or rural context. In addition, there is a large Safeway grocery store in the Hechinger mall adjacent to the site and a 42,000 SF Giant grocery store under construction at the other end of H Street that makes using this site as an Aldi superfluous.

Chapter 7: Design Approach

With the reality that changes in the US housing industry occurs at a slow rate, a decision was made to pursue a joint thesis of architecture and real estate development in order to inform the design process in selecting appropriate strategies that can be applied today. The joint thesis resulted in a design process that took into consideration of current construction practices, market, financial and legal issues that both informed and challenged the design.

As a result of the market analysis conducted for this site, a mix-use multifamily rental apartment was added to the program. Flexibility strategies were expanded to include possible applications in higher density housing, as well as design considerations on an urban scale. The focus shifted away from specific tectonic solutions and more on the principles and strategies that can applied during a design process of any housing project.

Design on an Urban Scale

Figure 7.1: Design intervention in context- apartment (red), live work 2.0 (dark orange), duplex (light orange), and gen 2 townhouse (yellow).

In response to the site and market analysis, a variation of housing types have been placed in strategic location to create a transition between a commercial and low density housing neighborhood. A mix-use, mix-income rental apartment has been located on 17th Street, west of the site, where there are large plots of commercially zoned properties across the street with redevelopment efforts are in the works. The retail spaces in the building will be able to take advantage of the more heavily traveled 17th Street and Maryland Avenue NE. On the rest of the site, 33 townhouses were developed to respond to the different characters of street condition, resulting in 3 different townhouse designs.

The variation of the housing types within a block works as one of the strategies to create flexibility on an urban scale. This strategy allows residents the opportunity to move into a different housing unit without being forced to leave their community. Variation also results in providing a mix-income neighborhood that prevents large areas to be negatively identified as the low-income housing.

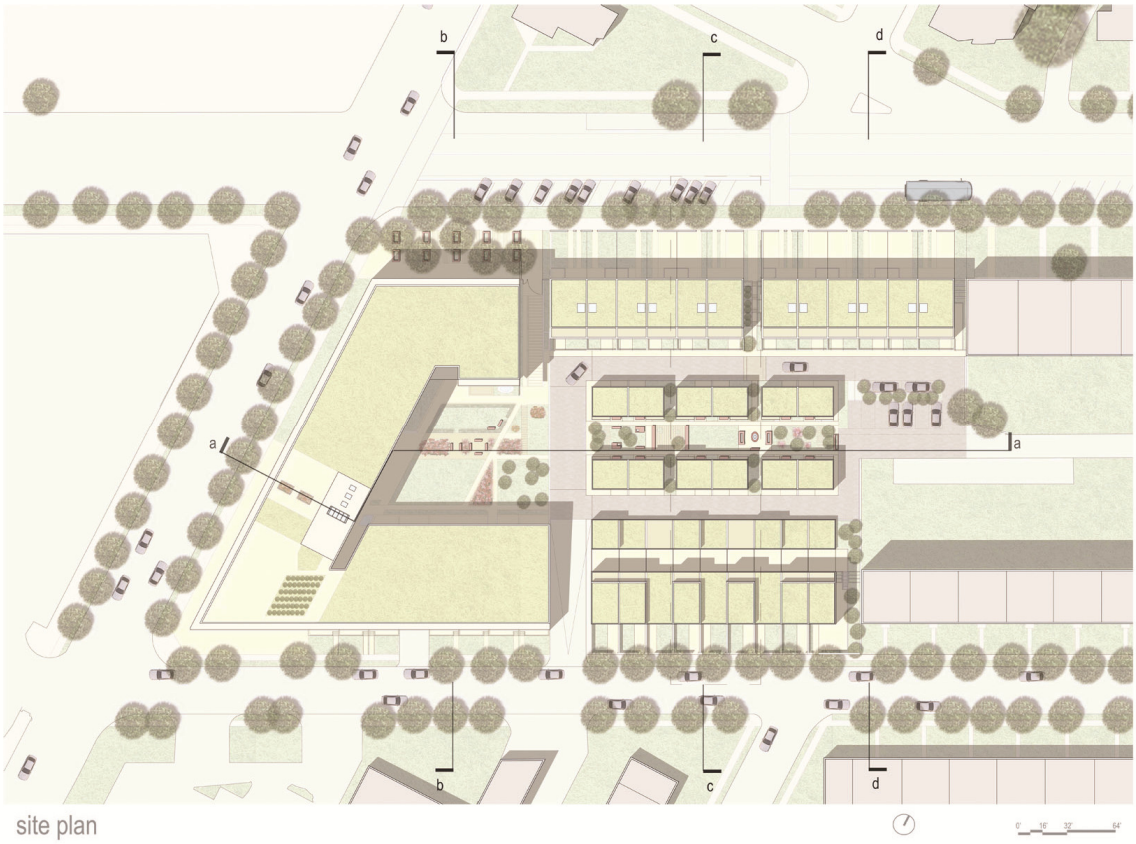

Figure 7.2: Site Plan-

The first townhouse the twelve “Live Work 2.0” units are situated on Maryland Avenue NE, along the north of the site. (Figure 7.2-7.3) Being more heavily traversed and commercialized street, there was an opportunity for retail and commercial use on the ground floor in the future. On the southern edge of the site, nine “Generation 2 Townhouses” or “Gen 2” units were created in response to the quiet residential street. (Figure 7.4) Within the block, 12 duplexes around a small linear park was also created to place more density on the site and utilize the value land better than a large empty yard.

Figure 7.3: Northwest Elevation – “Live Work 2.0” townhouses and Point 901 Apartment in context. The Live Work units were designed with both retail and residential use in mind on the ground floor.

Figure 7.4: Southeast Elevation – Apartment and Gen 2 townhouse next to existing garden apartments.

Figure 7.5: West Elevation – The apartment units on the west were given deeper balconies that can be either enclosed by glass windows or by screens to be used year round.

Figure 7.6: Section A – A cut through the entrance lobby of the apartment, garage, and the linear park between the two rows of the duplex units.

Figure 7.7: Section C- From right to left: Live Work, Duplex 1 and 2, Gen2 detached garage and townhouse.

Figure 7.8: Section D – Cut through of Live Work unit and landscaped parking

Flexible Strategies used

For both the townhouse and apartment, specific flexibility strategies were utilized in designing each building. In terms of construction strategies, the principal of separation of building layers was used as well as grouping of the service in both vertical and horizontal direction. This resulted in increasing the floor to floor height so that services will have. The strategy of combining and dividing units were used to allow expansion and contraction of households.

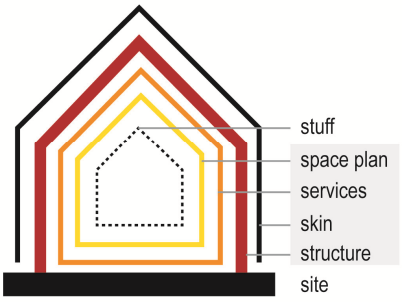

Figure 7.9: Brand's Layers of Building.

Flexibility in Townhouses

The live work units were designed with either 20 or 24 feet width, with the vertical circulation configured and located to allow the division of the building into multiple units within. With the width of 20 feet on center, a single level unit can become a 500 SF studio living space to be rented out or sold as a condominium. Its location on Maryland Avenue would allow the ground floor to become small business incubators, such as a small tech office, studio, or gallery.

The Gen2 units were designed with 18 feet width dimension to illustrate what kind of flexibility a townhouse could have limited width. Without a separate garage, the

townhouse will be limited to granny flat and family living division, or very skinny and compact unit. However, in practice it would be difficult to convince people to fit into a compact lifestyle unless the density or cost of living pushes people to live that way. If the population around the H Street continued to grow with high housing demand, the Live Work 2.0 and Gen 2 townhouses would be able to support additional 48 households even without vertical addition or significant renovation.

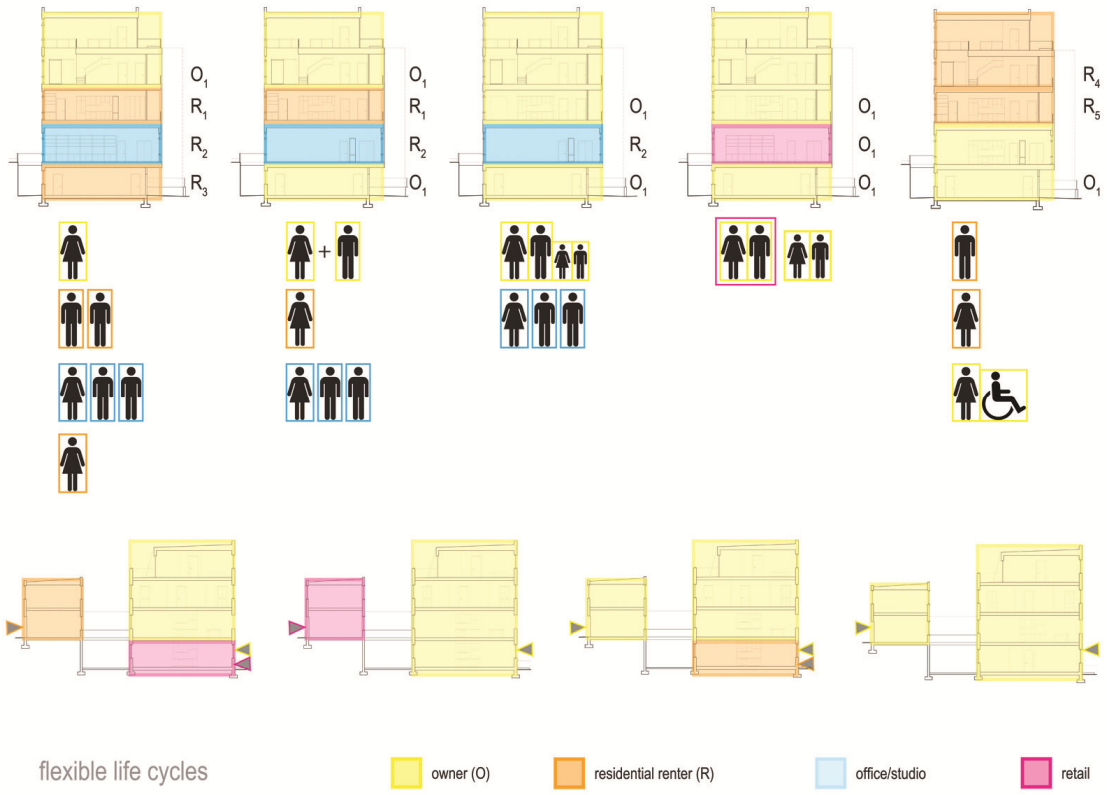

Figure 7.10: Flexible Life Cycles- The live work diagram depicts how the home owner could expand, contract, and use the space within a flexible townhouse over time. The lower diagram shows how the Gen 2 can be divided into 2 or three units on the same property.

Figure 5.7: Transect plans 1through 3- showing how each level of the different unit type relate to each other and context. Variations of floor plans are also depicted to show a range of flexibility of each unit type.

Figure: 7.11: Transect plans 4 through 6.

Flexibility in larger multifamily buildings

The apartment is designed so that the unit mix of the building can be easily altered with simple modification. A unit can expand and contract through trading ownership of rooms in between the living spaces. However, this system of trading zones will work with the whole building owned by one entity as a rental property or co-operative housing due to the lack of legal structure to allow trading within a condo scenario. The ability to change unit mix of a building can be very advantageous to the property owner who plans on keeping the building for long periods of time. The ability to change the unit mix to respond a change demand can help keep a property stay competitive.

The separation of building layers and grouping the services in an accessible location around the hall also gives this apartment the opportunity to be easier to maintain and update without inconveniencing the residents of the units, and help the building last longer.

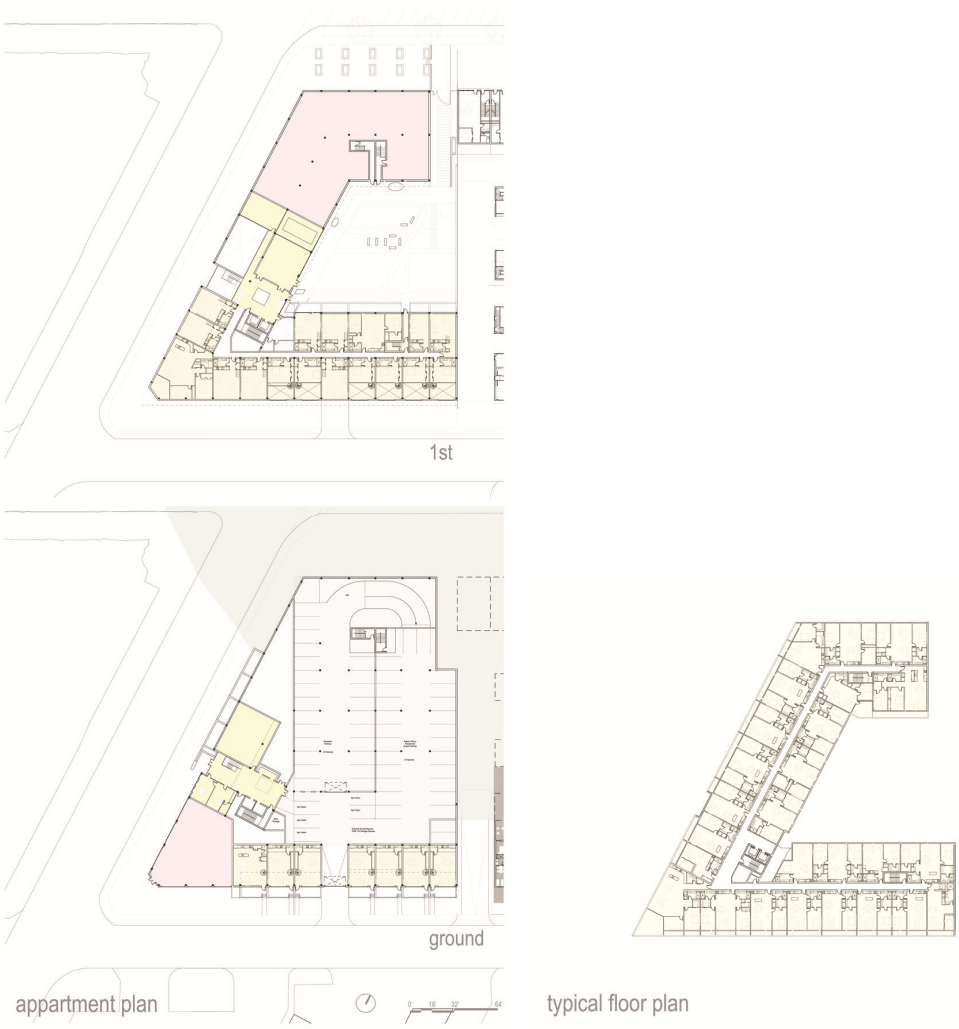

Figure 7.12 Ground, first and typical apartment floor plan.

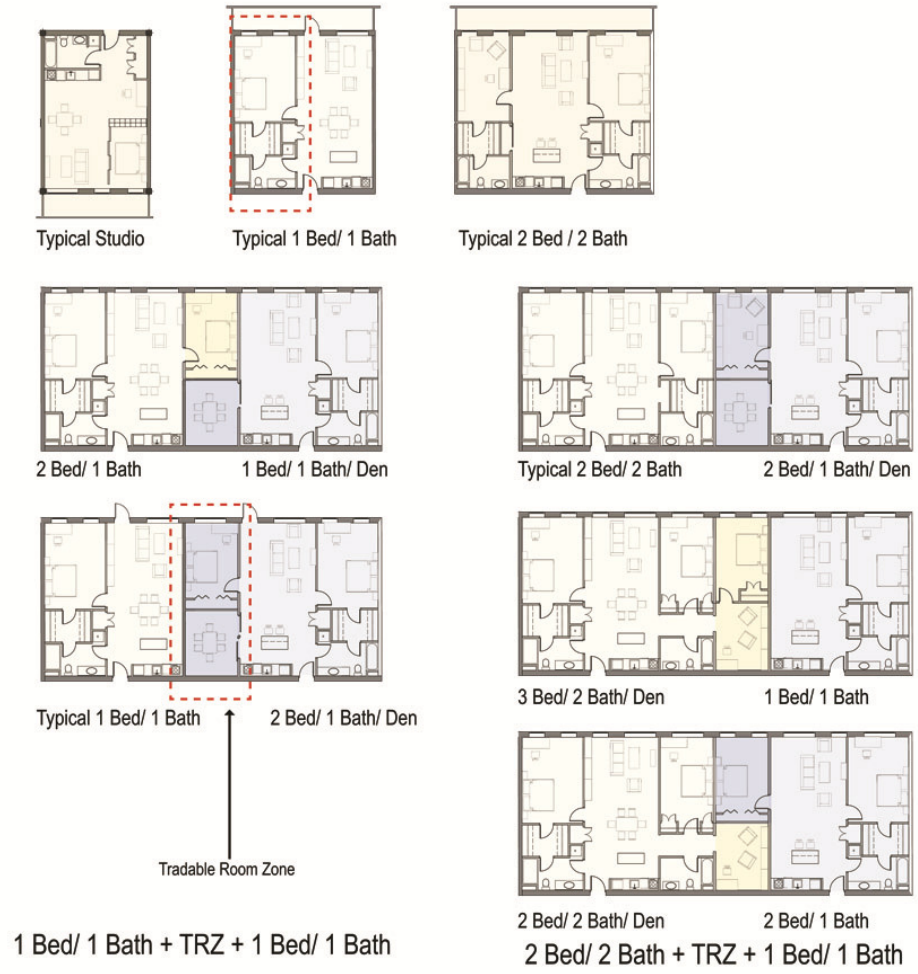

Figure 7.13- Unit Variation Diagram- The simple floor plans of units allow the “tradable room zones” to be easily traded between two units through creating new opening and closing the old openings.

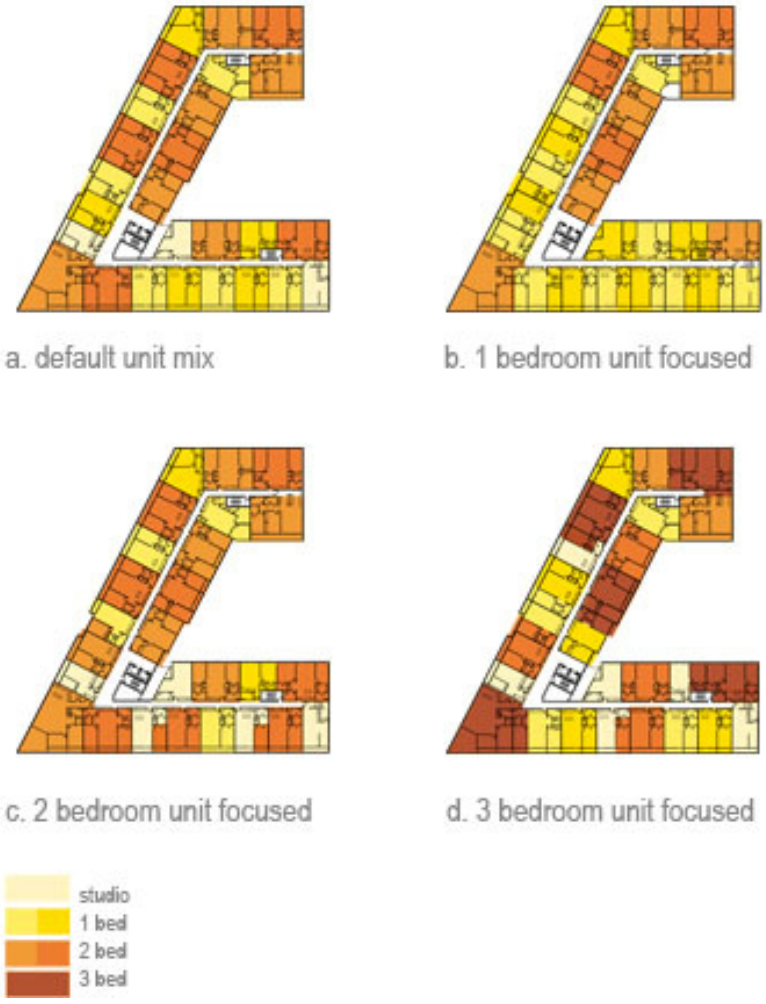

Figure 7.14: As the result of having tradable room zones from simple floor plans, a variation of unit mix can be provided on the floor. Over time, a rental apartment owner could change their unit mix to meet the market demand changes and helping the building to be competitive.

Conclusion

Creating more flexible housing does not require an expensive construction technology or overly clever mechanism. Flexibility can be provided through the design process with regards to how to separate the building layers, and what kind of flexible strategies at what scale should be applied. Allowing enough flexibility so that households can expand and contract or for the space to be used in other ways can potentially have great benefit for owners and developers, and allow the building to last longer. With constant changes in our population demographics, lifestyle, and technology, incorporating simple flexibility strategies should become a standard practice.

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